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10/585,039	08/29/2006	Geoffrey Canright	OSL-037	6064

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EXAMINER	
NICKERSON, JEFFREY L	
ART UNIT	PAPER NUMBER
2142	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,039	CANRIGHT ET AL.	
	Examiner	Art Unit	
	JEFFREY NICKERSON	2142	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 August 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: *Search Evidence of Lack of Antecedent Basis*.

DETAILED ACTION

1. This communication is in response to Application No. 10/858,039 filed nationally on 29 August 2006 and internationally on 29 December 2004. The preliminary amendment, which provides change to claims 1-14 and adds claim 15, is hereby acknowledged. Claims 1-15 have been examined.

Specification

2. Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

3. The abstract of the disclosure is objected to under 37 CFR 1.72(b) because it contains the implied and legal phraseology. The phrase “is disclosed” in the first sentence falls into the category of implied phraseology. The phrase “said network” in

the second sentence falls into the category of legal phraseology. Correction is required. See MPEP § 608.01(b).

Claim Objections

1. Claims 2 and 4 are objected to under 37 CFR 1.75(d)(1) because of the following informalities: lack of antecedent basis.

Regarding claim 2, this claim recites the limitation "the number of different types of bonds" in line 3. There is insufficient antecedent basis for this limitation in the claim. Correction is required.

Regarding claim 4, this claim recites the limitation "each different type of bond" in line 4. There is insufficient antecedent basis for this limitation in the claim. Correction is required.

For purposes of further examination the term "bond" will be interpreted as being "protocol or communication variations" on a single network link.

2. Claims 10-14 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Regarding claims 10-14, these claims recite an intended use of a parent claim and do not contain a transitional phrase. Furthermore, these claims do not further limit the parent claim because they neither a) narrow the scope of at least one particular step nor b) add an additional step. As such, these claims will not be given patentable weight.

3. Claims 10-14 are objected to under 37 CFR 1.75 as being a substantial duplicate of claim 1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Regarding claims 10-14, since these claims do not further limit their parent claim they are substantial duplicates.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 7 and 8 recite the limitation "non-self-retracing link path" in lines 4 of both claims. There is insufficient antecedent basis for this limitation in the claim.

Regarding claims 7 and 8, nowhere in the specification or claim language does applicant provide a definition or explanation for the phrase “non-self-retracing link path.” One of ordinary skill in the art at the time the invention was made would not understand the phrase as written, as retracing in the electrical art typically deals with refreshing screen pixels or oscilloscope signals. Tracing in the networking art is commonly used for identifying node hops from point A to point B, but this known concept does not enlighten one of skill in the art as to what a "non-self-retracing link path” might be.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Girvan et al (“Community Structure in Social and Biological Networks”, 11 June 2002), and in further view of Borgatti (“Centrality and Network Flow”, 17 February 2002), Cheng (“Mean Shift, Mode Seeking, and Clustering”, August 1995), and Hanneman (“Introduction to Social Network Methods”, 2001).

Regarding claim 1, Girvan teaches a method for determining the ability of a network to spread information or physical traffic (Girvan: abstract), said network including a number

of network nodes interconnected by links (Girvan: abstract specifies connections between nodes), said method comprising the steps of:

mapping the topology of a network (Girvan: Figure 1; See also pg 7823, “Computer-Generated Graphs” section);

computing a value for link strength between the nodes (Girvan: pg 7821-7822, “Traditional methods" section specifies calculating weights for pairs of nodes, i.e. links; See also Figure 2)

identifying nodes which are local maxima of the weights as centre nodes (Girvan: pg 7822, “Edge ‘Betweeness’ and Community Structure” section, paragraph 2; See also pg 7824-7825, Figures 4, 5, and 6)

grouping the nodes into regions surrounding each identified center node (Girvan: abstract specifies splitting into communities; See also Figure 6)

assigning roles to nodes, wherein types of roles include center nodes, region member nodes, and border nodes (Girvan: pg 7822, “Edge ‘Betweeness’ and Community Structure” section; See also pg 7824-7825, Figures 4, 5, and 6),

measuring the susceptibility of the network to spreading (Girvan: pg 7825, “Collaboration Network” section).

Girvan does not teach computing an Eigenvector centrality index for the nodes based on link strength values and used to identify centre nodes, nor does Garvin teach assigning roles of bridge nodes and dangler nodes and wherein the region members are assigned based on a steepest ascent link path terminating at a unique centre node

in the topology map. Nor does Garvin teach measuring susceptibility of spread based on number of regions, the size of the regions, and how the regions are connected.

Borgatti, in a similar field of endeavor, teaches computing an Eigenvector centrality index for nodes based on link strength values and used to identify centre nodes (Borgatti: pg 56, introduction section; pg 61, paragraphs 3-4). Borgatti further teaches measuring susceptibility of spread based on number of regions, the size of the regions, and how the regions are connected (Borgatti: pg 62, paragraphs 3-4 specify infection is based on the eigenvector centrality, which takes all of these into consideration). Borgatti does not teach the roles of bridge nodes and dangler nodes, nor does Borgatti teach wherein the region members are assigned based on a steepest ascent link path terminating at a unique centre node in the topology map.

Cheng, in a similar field of endeavor, teaches creating groups (kernels/clusters) with data members based on the gradient ascent to the nearest maxima (Cheng: pg 790, introduction; pg 793, “convergence” section; pg 796, “Clustering as a natural process” section; See also Figure 4). Cheng does not teach assigning roles of bridge and dangling nodes.

Hanneman, in a similar field of endeavor, teaches role use such as bridges and sinks/dangling nodes (Hanneman: pg 77, paragraph 3 specifies bridges; pg 40, paragraph 2 for sinks).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of Borgatti for using an Eigenvector Centrality Index, the teachings of Cheng for clustering based on gradient ascent, and

the teachings of Hanneman for analyzing social network roles. The teachings of Borgatti/Cheng/Hanneman, when implemented in the Girvan system, will allow one of ordinary skill in the art to calculate centrality using various measurements and assign typical roles based on characteristics of node associations, such as gradient ascent measurements. One of ordinary skill in the art would be motivated to utilize the teachings of Borgatti/Cheng/Hanneman in the Girvan system in order to analyze the social and connection interactions between network nodes with commonly accepted social networking principles (measuring centrality, using eigenvector centrality indexes, clustering based on gradient ascent, and assigning roles to network members based on their social connection characteristics).

Regarding claim 2, the Girvan/Borgatti/Cheng/Hanneman method teaches wherein computing said link strength value further comprises counting a number of different types of communication variations any pair of nodes uses in their interaction and using the number of communication variations as a measure for link strength (Borgatti: pg 56, "Typology of flow processes" section describes all the various types of relationship types; pg 59, "Relation to centrality measures" section describes how these communication variations affect link strength/centrality).

Regarding claim 3, the Girvan/Borgatti/Cheng/Hanneman method teaches wherein computing said link strength value further comprises measuring the traffic between any

two nodes and using the measure of traffic as a measure for link strength. (Borgatti: pg 60, last paragraph specifies traffic volume is used to measure link strength/betweeness)

Regarding claim 5, the Girvan/Borgatti/Cheng/Hanneman method teaches further comprising organizing said link strength values into an adjacency matrix and computing the Eigenvector Centrality index as the principal eigenvector of said adjacency matrix (Borgatti: pg 61, paragraph 3).

Regarding claim 6, the Girvan/Borgatti/Cheng/Hanneman method teaches further comprising assigning the role of border nodes to all nodes that have no unique association to any one centre node (Girvan: pg 7825, Figure 6 depicts subset regions as borders, in particular the Statistical physics group has two subset "border" regions, one between the Statistical Physics group and the Mathematical Ecology Group and represented with light gray squares, and one between the Statistical Physics group and the Structure of RNA group and represented with dark gray squares. See also Hanneman: pg 82-84 “N-Clans" section)

Regarding claim 7, the Girvan/Borgatti/Cheng/Hanneman method teaches further comprising assigning the role of bridge nodes to all border nodes which lie on at least one non-self-retracing link path connecting two centre nodes (Girvan: pg 7825, Figure 6 depicts bridging nodes connecting the center nodes of groupings; See also Hanneman: pg 77, paragraph 3 and pg 90, paragraph 2).

Regarding claim 8, the Girvan/Borgatti/Cheng/Hanneman method teaches further comprising assigning the role of dangler nodes to all border nodes which lie on no non-self-retracing link path connecting centre nodes (Girvan: pg 7825, Figure 6 depicts sink nodes in the border groupings; See also Hanneman: pg 128-129, last paragraph beginning with “For a first step..”, and pg 40, paragraph 2 and pg 43, paragraph 2 beginning with “We can also look…”).

Regarding claim 9, the Girvan/Borgatti/Cheng/Hanneman method teaches further comprising preventing spreading of a virus in the network by identifying which nodes to protect (Hanneman: pg 37, paragraph 3 indicates disease spreading is a concern for the most connected nodes; Borgatti: pg 58, section 2.6 indicates infection as a type of communication variation).

Regarding claim 10, this claim does not contain any further limitations and is therefore rejected under the same rationale as the parent claim, claim 1, where applicable.

Regarding claim 11, this claim does not contain any further limitations and is therefore rejected under the same rationale as the parent claim, claim 1, where applicable.

Regarding claim 12, this claim does not contain any further limitations and is therefore rejected under the same rationale as the parent claim, claim 1, where applicable.

Regarding claim 13, this claim does not contain any further limitations and is therefore rejected under the same rationale as the parent claim, claim 1, where applicable.

Regarding claim 14, this claim does not contain any further limitations and is therefore rejected under the same rationale as the parent claim, claim 1, where applicable.

Regarding claim 15, the Girvan/Borgatti/Cheng/Hanneman method teaches further comprising preventing spreading of harmful information in the networks by identifying which nodes to protect (Hanneman: pg 37, paragraph 3 indicates disease spreading is a concern for the high connected nodes).

Regarding claim 4, the Girvan/Borgatti/Cheng/Hanneman method teaches computing link strength using various formulas and variables, including, but not limited to, communication type (Borgatti: pg 59, table 1 lists the communication types; Borgatti: pg 59, section "Relation to centrality measures" details how communication types, traffic volume, and “distance" affect centrality; See pg 60 for formula calculating betweeness; Hanneman: pg 67, paragraph 2 specifies that the betweeness measurement can be normalized as a percentage of the maximum possible betweeness). The Girvan/Borgatti/Cheng/Hanneman method does not specify normalizing each communication variation and summing the resulting fractions and using it to calculate link strength.

A person of ordinary skill in the art, upon reading the prior art, would also have recognized the desirability of improved methods for calculating the link strength and subsequently, centrality. However, since there are a finite number of measurable characteristics relating to link strength, a finite number of results could occur from variations utilizing those characteristics. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply measurable characteristics taught in the Girvan/Borgatti/Cheng/Hanneman method in an attempt to provide an improved formulation for calculating the link strength and centrality, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp. In turn, because the link strength calculation defined by applicant has the properties predicted by the prior art and there are a finite number of predictable results obtained from manipulating the characteristics, it would have been obvious to make the calculation using the technique defined by applicant.

Cited Pertinent Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Boyd ("Numerical Methods for Bayesian Ratings from Paired Comparisons", 1991) discloses a method for locating maxima using steepest gradient and applying this to ratings of players. Boyd further discusses why a conjugate gradient method is preferred in locating nearby maxima.

b. Canright et al ("Roles in Networks", 17 July 2004) discloses assigning roles to nodes in networks based off various measurements.

c. Satorras et al ("Epidemic Spreading in Scale-Free Networks", 2 April 2001) discloses social network analysis with specific regard to spreading of viruses.

d. Ibe et al (US 6,437,804 B1) discloses a method for grouping nodes based on weighted edges of nodes.

e. Kamvar et al (US 2005/0033742 A1) discloses a method for ranking nodes based on matrix partitions.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEFFREY NICKERSON whose telephone number is (571)270-3631. The examiner can normally be reached on M-Th, 8:30-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on 571-272-3868. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. N./
Jeffrey Nickerson
Examiner, Art Unit 2142

/Andrew Caldwell/
Supervisory Patent Examiner, Art Unit 2142